

### **ABSTRACT OF THE DISCLOSURE**

[0091] Systems and methods are described for hybrid spread spectrum radio systems. A method includes modulating a signal by utilizing a subset of bits from a pseudo-random code generator to control an amplification circuit that provides a gain to the signal. Another method includes: modulating a signal by utilizing a subset of bits from a pseudo-random code generator to control a fast hopping frequency synthesizer; and fast frequency hopping the signal with the fast hopping frequency synthesizer, wherein multiple frequency hops occur within a single data-bit time.